

CLAIMS

1. A pulse tube refrigerator (PTR) arrangement within a cryogenic apparatus, wherein a regenerator tube of the PTR is finned.

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2. A PTR arrangement according to claim 1, wherein a first regenerator tube is finned across part of the length of the tube.

3. A PTR arrangement according to claim 1, wherein the PTR
10 arrangement comprises two stages and the second stage regenerator tube is finned.

4. A PTR arrangement according to claim 1, wherein the PTR arrangement is a multi-stage PTR arrangement.

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5. A PTR arrangement according to claim 1, wherein the regenerator tube is fabricated from a thin walled alloy which has a moderate thermal conductivity at low temperatures.

20 6. A PTR arrangement according to claim 1, wherein the fins comprise annular fins.

7. A PTR arrangement according to claim 6, wherein the annular fins are spaced apart regularly, along an outside of the regenerator tube.

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8. A PTR arrangement according to claim 6, wherein the annular fins are not of a uniform size.

9. A PTR arrangement according to claim 1, wherein the fins
5 comprise one or more spirally arranged strip sheets.

10. A PTR arrangement according to claim 1, wherein the fins comprise outwardly extending prongs.

10 11. A PTR arrangement according to claim 1, wherein the fins comprise rectangular sheets attached about the circumference of the regenerator tube, the sheets being attached along one edge to the regenerator tube.

15 12. A PTR arrangement according to claim 1, wherein the regenerator tube is corrugated whereby to define fins which comprise part of the wall of the tube, which is corrugated either axially with respect to an axis of the tube or perpendicularly with respect to said axis.

20 13. A PTR arrangement according to claim 1, wherein the fins comprise one or more types of fin.

14. A PTR arrangement according to claim 1, wherein one or more pulse tubes have insulated walls.

15. A pulse tube refrigerator PTR according to claim 1, wherein the PTR is associated with a magnetic resonance imaging apparatus.

16. A method of using a pulse tube refrigerator (PTR) arrangement
5 within a cryogenic apparatus wherein the regenerator tube of the PTR arrangement is finned, the method comprising the step of transferring heat from an atmosphere surrounding the tubes of the PTR assembly to the regenerator tube via fins associated with the regenerator tube.

10 17. A method according to claim 16 wherein the recondensor is associated with a magnetic resonance imaging apparatus.